Notice of Allowability	Application No.	Applicant(s)	
	10/065,848	LASKARIS ET AL.	
	Examiner	Art Unit	
	Tiffany A. Fetzner	2859	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *the pre-Appeal decision of 2/01/2007 & the telephonic interview of 4/15/2007*.

2. ☒ The allowed claim(s) is/are *Examiner Amended claims 1-36*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date *20070415* .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

Examiner's Amendment

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

2. Authorization for this examiner's amendment was given in a telephone interview with **Attorney Tait R. Swanson Reg. No. 48,226** on April 15th 2007 along with authorization to charge any necessary fees to applicant's deposit account.

3. The application has been amended as follows:

A) Replace claim 1 of the **June 22nd 2006** amendment and response with the following **Examiner amended claim 1**:

Claim 1 --- An open magnetic resonance imaging (MRI) device, comprising:

a main coil configured to generate a magnetic field to image a volume, wherein the main coil comprises a first axis, a first radius, and a first axial distance from the volume;

a plurality of shaping coils comprising second axes, second radii, and second axial distances from the volume, wherein the second radii are smaller than the first radius of the main coil, and wherein the second axial distances are greater than or equal to the first axial distance of the main coil to shape the magnetic field in the volume;

a substantially cylindrical support comprising a third axis and a third radius, wherein the first, second, and third axes are generally aligned with one another, wherein the substantially cylindrical support is disposed radially between **and completely separating** the main coil and from the plurality of shaping coils; and

a pressure vessel disposed about the main coil, the plurality of shaping coils, and the substantially cylindrical support. ---

B) Insert previously presented **claims 2** through **16** of the **June 22nd 2006 amendment and response**:

Claim 2 --- The open MRI device of **claim 1**,

wherein the main coil is positioned on an outer circumferential surface of the substantially cylindrical support, and

wherein at least one of the shaping coils is positioned on an inner circumferential surface of the substantially cylindrical support. ---

Claim 3 --- The open MRI device of **claim 1**, comprising:

a hub positioned along the third axis of the substantially cylindrical support; and

a gusset positioned radially between the substantially cylindrical support and the hub. ---

Claim 4 --- The open MRI device of **claim 1**, comprising:

at least one support post positioned between a first half and a second half of the open MRI device, wherein the first half comprises the main coil, the plurality of shaping coils, the substantially cylindrical support, and the pressure vessel, and the second half comprises another main coil, another plurality of shaping coils, another substantially cylindrical support, and another pressure vessel in generally the same arrangement as the first half. ---

Claim 5 --- The open MRI device of **claim 4**, wherein the at least one support post is attached on one end to a flange formed on the pressure vessel in the first half and attached on an opposite end to another flange formed on the other pressure vessel in the second half. ---

Claim 6 --- The open MRI device of **claim 3**, wherein at least one of:

the substantially cylindrical support, the hub, or the gusset comprises stainless steel, aluminum, or fiber-reinforced composites. ---

Claim 7 ---The open MRI device of **claim 2**, further comprising:
at least one ferromagnetic ring positioned on the outer circumferential surface of the substantially cylindrical support. ---

Claim 8 --- The open MRI device of **claim 7**, wherein the at least one ferromagnetic ring is positioned substantially between coils having opposite current directions to shield interactions between the coils having opposite current directions. ---

Claim 9 --- The open MRI device of **claim 7**, wherein the MRI device comprises at least four ferromagnetic rings. ---

Claim 10 --- The open MRI device of **claim 2**, further comprising:
at least one shielding coil positioned on the outer circumferential surface of the substantially cylindrical support and configured to shield the magnetic field. ---

Claim 11 --- The open MRI device of **claim 10**, wherein the MRI device comprises at least two shielding coils. ---

Claim 12 --- The open MRI device of **claim 1**, wherein the MRI device comprises at least eight shaping coils. ---

Claim 13 --- The open MRI device of **claim 1**, wherein at least one of the shaping coils is configured to shape the magnetic field in the volume to a uniformity of at least 10 ppm. ---

Claim 14 --- The open MRI device of **claim 1**, wherein the MRI device comprises an even number of shaping coils. ---

Claim 15 ---The open MRI device of **claim 14,** wherein a first half of the number of shaping coils have a first magnetic polarity and a second half of the number of shaping coils have a second magnetic polarity substantially opposite that of the first magnetic polarity. ---

Claim 16 --- The open MRI device of claim 1, wherein at least one of the plurality of shaping coils has a magnetic polarity opposite to a magnetic polarity of another of the plurality of shaping coils. ---

C) **Replace claim 17** of the **June 22nd 2006 amendment and response** with the following **Examiner amended claim 17**:

Claim 17 --- A magnetic resonance imaging (MRI) apparatus for imaging a volume, comprising:

at least one main coil configured to generate a magnetic field about the volume, wherein the at least one main coil comprises a first axis and a first radius;

at least one bucking coil comprising a second axis and a second radius, wherein the at least one bucking coil is configured to shield the magnetic field from the at least one main coil;

a plurality of shaping coils comprising third axes and third radii, wherein the plurality of shaping coils are configured to shape the magnetic field in the volume; and

a plurality of ferromagnetic rings comprising fourth axes and fourth radii, wherein the plurality of ferromagnetic rings are configured to shield interactions between coils of opposite polarity, wherein the first, second, third, and fourth axes are generally aligned with one another, wherein at least one ring of the plurality of ferromagnetic rings is positioned axially between the at least one main coil and the at least one bucking coil, wherein the at least one main coil, the at least one bucking coil, and the at least one ring are positioned in a radially overlapping stacked relationship with **each in the space directly on top of** another. ---

D) Insert previously presented **claims 18** and**19** of the **June 22nd 2006 amendment and response**:

Claim 18 --- The MRI apparatus of **claim 17**, further comprising:

a single unit support structure configured to support the at least one main coil, the at least one bucking coil, the plurality of shaping coils, and the plurality of ferromagnetic rings. ---

Claim 19 --- The MRI apparatus of **claim 18**, wherein the single unit support structure comprises:

a substantially cylindrical shell;

a hub positioned along a substantially central axis of the cylindrical shell; and

a gusset positioned radially between the substantially cylindrical shell and the hub. ---

E) Replace claim 20 of the **June 22nd 2006 amendment and response** with the following **Examiner amended claim 20**:

Claim 20 --- A magnetic resonance imaging (MRI) apparatus for imaging a volume, comprising:

means for generating a magnetic field for imaging the volume;

means for shielding the magnetic field from means for generating; and

means for shaping the magnetic field radially smaller than the means for generating the magnetic field and positioned axially further from the volume than the means for generating the magnetic field or in a plane of the means for generating the magnetic field; and

means for intermediately shielding at a region **that is** at least substantially, or entirely, directly between the means for generating and the means for shielding,

wherein the means for generating, the means for shielding, and the means for intermediately shielding **at the region** are positioned in an axially stacked relationship with **each in the space directly on top of** another.

F) Insert previously presented **claims 21** and **22** of the **June 22nd 2006 amendment and response**:

Claim 21 --- The MRI apparatus of **claim 20**, further comprising:
means for supporting the means for generating, the means for shielding, the means for shaping, and the means for intermediately shielding. ---

Claim 22 --- The MRI apparatus of **claim 20**, wherein the means for intermediately shielding comprises:

means for intermediately shielding interactions between opposite polarities of the means for generating and the means for shielding. ---

G) Replace claim 23 of the **June 22nd 2006 amendment and response** with the following **Examiner amended claim 23**:

Claim 23 --- An open magnetic resonance imaging (MRI) device, comprising:

first and second main coils configured to generate a magnetic field to image a volume;

first and second sets of shaping coils positioned adjacent to each of the first and second main coils, respectively, each set of shaping coils being radially smaller than the respective main coil and positioned axially further from the volume than the respective main coil or in a plane of the respective main coil to shape the magnetic field in the volume;

a cylindrical support structure comprising a first cylindrical portion and a second cylindrical portion, wherein the first cylindrical portion is disposed radially between **and completely separating** the first main coil from the first set of shaping coils, and the second cylindrical portion is disposed radially between **and completely separating** the second main coil from the second set of shaping coils; and

an enclosure comprising a first enclosure portion and a second enclosure portion, wherein the first enclosure portion is disposed about the first main coil, the first set of shaping coils, and the first cylindrical portion, and the second enclosure portion is disposed about the second main coil, the second set of shaping coils, and the second cylindrical portion. ---

H) Insert previously presented **claims 24** through **31** of the **June 22nd 2006 amendment and response**:

Claim 24 --- The open MRI device of **claim 1**, comprising a ferromagnetic ring disposed in an axially stacked relationship with the main coil. ---

Claim 25 --- The open MRI device of **claim 24**, comprising a shielding coil disposed in the axially stacked relationship with the main coil and the ferromagnetic ring. ---

Claim 26 --- The open MRI device of **claim 1**, comprising a shielding coil and a ferromagnetic ring, wherein the ferromagnetic ring is disposed directly axially between the main coil and the shielding coil. ---

Claim 27 --- The open MRI device of **claim 1**, comprising a shielding coil and a ferromagnetic ring disposed between the main coil and the shielding coil, wherein the main coil, the ferromagnetic ring, and the shielding coil are generally positioned in an axially stacked relationship with one another. ---

Claim 28 --- The open MRI device of **claim 27**, wherein the pressure vessel is disposed about the main coil, the ferromagnetic ring, the shielding coil, the plurality of shaping coils, and the substantially cylindrical support. ---

Claim 29 --- The open MRI device of **claim 28**, comprising a central hub and a gusset disposed radially inside the substantially cylindrical support, wherein the central hub is disposed radially inside the gusset. ---

Claim 30 --- The MRI apparatus of **claim 21**, wherein the means for supporting is disposed radially outside the means for shaping and radially inside the means for generating, the means for shielding, and the means for intermediately shielding. ---

Claim 31 ---The open MRI device of **claim 23**, comprising:

first and second shielding coils disposed axially about the first and second main coils, respectively; and

first and second ferromagnetic rings disposed axially between the first and second main coils and the first and second shielding coils, respectively. ---

I) **Replace claims 32 and 33** of the **June 22nd 2006 amendment and response** with the following **Examiner amended claims 32 and 33**:

Claim 32 --- The open MRI device of **claim 31**, wherein the first main coil, the first ferromagnetic ring, and the first shielding coil are generally positioned in an axially stacked relationship with **each in the space directly on top of** another; and wherein the second main coil, the second ferromagnetic ring, and the second shielding coil are generally positioned in another axially stacked relationship with **each in the space directly on top of** another. ---

Claim 33 --- A magnetic resonance imaging (MRI) device, comprising:

opposite cylindrical supports disposed about a magnetic resonance imaging region;

opposite shaping coils disposed about the magnetic resonance imaging region, wherein the opposite shaping coils are disposed concentrically within the opposite cylindrical supports, respectively;

opposite main coils disposed about the magnetic resonance imaging region, wherein the opposite main coils are disposed concentrically about the opposite cylindrical supports, respectively;

opposite ferromagnetic rings disposed concentrically about the opposite cylindrical supports, respectively; and

opposite shielding coils disposed concentrically about the opposite cylindrical supports, respectively;

wherein the opposite main coils, the opposite ferromagnetic rings, and the opposite shielding coils are positioned in an axially stacked relationship **with each in the space directly on top of another** along the opposite cylindrical supports, respectively;

wherein the opposite ferromagnetic rings are disposed axially between the opposite main coils and the opposite shielding coils, respectively,

wherein the opposite cylindrical supports separate the opposite shaping coils from the opposite main coils, the opposite ferromagnetic rings, and the opposite shielding coils. ---

J) Insert previously presented **claims 34** and **34** of the **June 22nd 2006 amendment and response**:

Claim 34 --- The MRI device of **claim 33,** wherein the opposite ferromagnetic rings are configured to shield interactions between the opposite main coils and the opposite shielding coils, respectively. ---

Claim 35 --- The MRI device of **claim 33**, comprising opposite pressure vessels disposed about the opposite cylindrical supports, the opposite shaping coils, the opposite main coils, the opposite ferromagnetic rings, and the opposite shielding coils, respectively. ---

K) Replace claim 36of the **June 22nd 2006 amendment and response** with the following **Examiner amended claim 36**:

Claim 36 --- A magnetic resonance imaging (MRI) device, comprising:
an axially stacked MRI arrangement, comprising:

a MRI main coil;

a MRI shielding coil; and

a MRI ferromagnetic ring, wherein the MRI ferromagnetic ring is positioned axially between and completely separating the MRI main coil and the MRI shielding coil in the axially stacked MRI arrangement with each in the space directly on top of another, wherein the axially stacked MRI arrangement is coupled to a single cylindrical support structure; and

a pressure vessel disposed about the axially stacked MRI arrangement and the single cylindrical support structure. ---

L) Cancel claim 37 of the **June 22nd 2006 amendment and response**.

M) Cancel claim 38 of the **June 22nd 2006 amendment and response**.

The following is an examiner's statement of **Reasons for Allowance:**

4. With respect to **independent claims 1, 17, 20, 23, 33** and **36**: These claims are considered to be allowable over the prior art of record because the prior art of record neither discloses nor suggests an MRI apparatus comprising the applicant's MRI apparatus and system, with the coil components, structures, and the positional geometrical relationships set forth within each of the independent claims. In is the way in which all of the recited components in each independent claim, are positioned and there individual geometrical interrelationships to one another, that distinguishes each of applicant's examiner amended independent claims fron the prior art of record.. It is the entire combination of the claim limitations taken as a whole that constitutes both the novelty and non-obviousness of applicant's claims.

5. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Examiner's Comment

Response to arguments

6. Applicant's arguments with respect to **claims 1-38** from the December 26th 200t6 pre-appeal request have been considered but are moot in view of the examiner amendments made herein which are fully supported by applicant's original specification, and clarify the relationships of the structural components that are clearly shown in applicant's originally filed figures. The amendments made clarify that which is already described and shown in applicant's specification with respect to remaining formal maters, and proper, consistent antecedent basis. No new matter was added by the examiner amendments set forth above.

Prior Art of Record

7. The **prior art made of record** and not relied upon is considered pertinent to applicant's disclosure.

A) ***Cheng et al.,*** US Patent Application publication 2003/0001575 A1 published January 2nd 2003, filed January 19th 2001.

B) ***Cheng et al.,*** PCT international publication WO 01/53847 A1 published 26 July 2001, filed January 19th 2001.

C) ***Danby*** US patent 6,201,394 B1 published March 13th 2001, filed November 21st 1997.

D) **Dorri et al.,** US patent 5,565, 831 issued October 15th 1996; This reference teaches a structure similar to **Bryne et al.,** in a non-"C" configuration but fails to show the presence of "gussets". It is pertinent to all claims but the applied prior art above is considered to be the most relevant.

E) **Pulyer** US patent 5,378,988 issued January 3rd 1995.

F) **Ries** US patent 5,347,252 issued September 13th 1994. See entire reference.

G) **Huson et al., US patent 5,315,276 issued May 24th 1994** This reference teaches a structure similar to **Bryne et al.,** but fails to show the presence of "gussets". It is pertinent to all claims but the applied prior art above is considered to be the most relevant.

H) **Westphal et al.,** US patent 5,485,088 issued January 16th 1996. [See entire reference.]

I) **Ohashi et al.,** US patent 5,864,275 issued January 26th 1999. [See entire reference.]

J) **Ohashi et al.,** US patent 5,963,117 issued October 5th 1999. [See entire reference.]

K) **Minas et al**., US patent 6,717,408 B2 issued April 6th 2004,; filed April 5th 2001. [See entire reference.]

L) **Minas et al**., US patent application publication 2002/0145426 A1 published October 10th 2002; filed April 5th 2001. [See entire reference.]

M) **Laskaris et al**., US patent application publication 2004/0100261 A1 published May 27th 2004; filed November 25th 2002. The examiner notes that this reference is the pre-grant publication of applicant's instant application, which is noted for the purposes of a complete record only, and is not available as prior art against the pending claims.

N) **Bryne et al.,** US patent 6,211,676 B1 issued April 3rd 2001.

O) **Chari et al**., US patent 5,307,039 issued April 26th 1994.

P) **Lvovsky et al.,** US patent 6,570,475 B1 issued may 27th 2003, filed November 20th 2000.

Q) **Kinanen** US patent 6,335,670 B1 issued January 1st 2002, filed April 14th 2000.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tiffany Fetzner whose telephone number is: (571) 272-2241. The examiner can normally be reached on Monday-Thursday from 7:00am to 4:30pm., and on alternate Friday's from 7:00am to 3:30pm.

9. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez, can be reached at (571) 272-2245. The **only official fax phone number** for the organization where this application or proceeding is assigned is **(571) 273-8300**.

10. Information regarding the status of an application may be obtained from the Patent Application information Retrieval (PAIR) system Status information for published applications may be obtained from either Private PMR or Public PMR. Status information for unpublished applications is available through Private PMR only. For more information about the PMR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PMR system contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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